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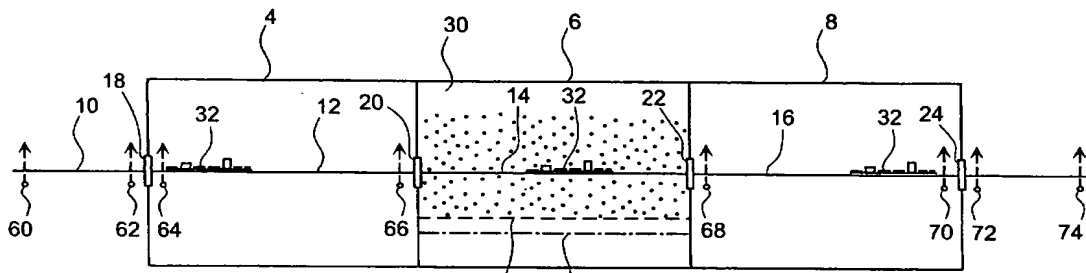
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(54) Title: METHOD AND APPARATUS FOR VAPOUR PHASE SOLDERING



(57) Abstract: The present invention concerns a method and an apparatus for performing soldering of items that are applied a soldering agent, where the soldering apparatus includes at least one soldering zone, where the soldering zone include means for generating vapour, the apparatus being adapted to heat the items to be soldered to a temperature required for soldering by condensing the vapour. Further the invention relates to a method and an apparatus for flux deposition connected to a soldering machine, which soldering machine comprises a solder heating medium evaporated by heating means forming a vapour that heats elements to be soldered by heat transfer and by condensation, which apparatus comprises means for condensation, of a vapour containing flux where pumping means circulate vapor containing flux through the condensation means, where the condensation means comprises heat exchangers for cooling the vapour for flux condensation.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/DK 03/00393

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B23K1/015

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B23K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 321 031 A (WOODGATE RALPH W) 23 March 1982 (1982-03-23) column 2, line 55 - column 3, line 10 column 5, line 16 - line 25 column 5, line 50 - line 67 abstract	1,4,8,9, 14-16,18
Y	US 4 580 716 A (BARRESI ANTHONY J ET AL) 8 April 1986 (1986-04-08) abstract	1,4,8,9, 14-16,18
A	US 5 156 325 A (MISHINA HARUO ET AL) 20 October 1992 (1992-10-20) column 4, line 26 - line 30 abstract	1-23



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INTERNATIONAL SEARCH REPORT

Information on patent family members

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PCT/DK 03/00393

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4321031	A	23-03-1982	CA 1132021 A1	21-09-1982
			CA 1142454 A2	08-03-1983
			DE 3064754 D1	13-10-1983
			EP 0023107 A1	28-01-1981
			JP 1151977 C	30-06-1983
			JP 56109156 A	29-08-1981
			JP 57039866 B	24-08-1982

US 4580716	A	08-04-1986	NONE	

US 5156325	A	20-10-1992	JP 2095026 C	02-10-1996
			JP 3193265 A	23-08-1991
			JP 8002495 B	17-01-1996

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